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Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,435,615**, on July 21, 2003, by **PI MANUFACTURING INC.**, assignee of Robert Bell, for "Multi-Purpose Tow Bar for a Trailer".

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ABSTRACT

A multi-purpose tow bar for a trailer and a trailer having a multi-purpose tow bar. In a towing position the tow bar couples the trailer to a moving vehicle such as a bicycle. In a stabilizing position the tow bar supports a third wheel extending forwardly of the trailer frame, converting the trailer into a self-supporting vehiclo such as a stroller or jogger. The tow bar is reversible, comprising first and second end portions which in the preferred embodiment respectively extend from an intermediate portion at first and second angles, the angle of the first end portion relative to the intermediate portion being circumferentially offset from the angle of the second end portion relative to the intermediate portion.

MULTI-PURPOSE TOW BAR FOR A TRAILER

FIELD OF THE INVENTION

The present invention relates to a trailer for a moving vehicle such as a bicycle. In particular, this invention relates to a multi-purpose tow bar for a trailer which serves as a tow bar in one position, and in a second position functions as a support for a third wheel to render the trailer self-supporting.

BACKGROUND OF THE INVENTION

Trailers for use with moving vehicles such as bicycles are known in the art. Such trailers can be used for carrying small children and other belongings. It is important that the trailer be easy to open and close and that it fold in a compact way so that it can be readily stored or moved in the trunk or confines of another vehicle, such as a car.

An example of such a trailer is shown and described in United States Patent No. 5,921,571 issued July 13, 1999 to Bell, which is incorporated herein by reference. This patent teaches a trailer having a folding frame which is readily collapsible and easy to manufacture. The trailer has a pair of wheels and the frame is provided with a tow bar, which is movable from a first position extending forwardly of the frame to thereby be coupled to a bicycle (or other vehicle) for towing, to a second position extending rearwardly of the frame where it serves as a handle so that the trailer can be pushed from behind, for example by a runner.

Such trailers have most of the components of a self-supporting vehicle, for example a so-called "jogger" which can be driven like a high speed stroller by a person running or jogging. However, like a conventional trailer, this trailer is supported on only two wheels and therefore does not have the ability to be self-supporting. In the trailer mode the front end of the trailer is supported by the towing vehicle which holds the free end of the tow bar, and thus the front of the trailer frame,

at an elevated position. When pushing the trailer, the runner must apply a constant downward force to the handle (i.e. the tow bar in the handle position) in order to maintain the front of the trailer frame at an elevated position, and manually maintain the handle at a relatively stable attitude for the comfort of the occupant. This can interfere with the proper running or jogging form and makes the trailer more difficult to control.

It is possible to attach a third stabilizing wheel to the frame, to make the trailer self-supporting and thereby convert it to a stroller or jogger-type vehicle. However, one of the benefits of such a trailer – and particularly the trailer described in U.S. Patent No. 5,921,571 – is that the trailer is compact and easily transportable. Thus, it is counterproductive to require the user to tote substantial additional parts, and tools for their assembly and installation, in order to have the ability to convert the trailer to a stroller or jogger. Further, while the lowest element of the trailer frame is fairly close to the ground, it would be advantageous to be able to use a larger stabilizing wheel, since larger wheels tend to be easier to control, especially in unfavourable road conditions, and less sensitive to defects in the pavement.

It would accordingly be advantageous to be able to readily convert the trailer into a self-supporting vehicle such as a stroller or jogger, without having to tote excessive parts and without requiring tools or any particular level of mechanical skill. It would be further advantageous to be able to maximize the diameter of the stabilizing wheel, for greater control and comfort of the occupant of the trailer in a self-supporting mode.

SUMMARY OF THE INVENTION

The present invention provides a multi-purpose tow bar for a trailer and a trailer having a multi-purpose tow bar. In a towing position the tow bar couples the trailer to a moving vehicle such as a bicycle. In a stabilizing position the tow bar

supports a third wheel extending forwardly of the trailer frame, converting the trailer into a self-supporting vehicle such as a stroller or jogger.

According to the invention the tow bar is reversible, comprising first and second end portions which respectively extend from an intermediate portion. Thus, the end portion that couples to the trailer in the towing position becomes the end portion that supports the wheel in the stabilizing position; likewise, the end portion that couples to the towing vehicle in the towing position becomes the end portion that couples to the frame in the stabilizing position.

In the preferred embodiment the first and second end portions extend from an intermediate portion at first and second angles, the second end portion being directed away from a plane containing the first end portion and the intermediate portion. In this embodiment the first and second end portions thus extend from the intermediate portion in a configuration which allows the tow bar to be affixed to the folding frame at two points, for a stable, rigid interface with the collapsible frame, while in the towing position allowing the end of the tow bar that couples to the towing vehicle to be laterally centred relative to the trailer frame and at a level suitable for a towing vehicle such as a bicycle; and in the stabilizing position raising the axle of the stabilizing wheel so that a larger stabilizing wheel can be used, which provides greater control for the driver and comfort for the occupant of the trailer; regardless of the configuration of the frame.

The present invention thus provides a multi-purpose tow bar for a trailer having a frame mounted on a pair of primary wheels, the tow bar comprising: an intermediate portion, a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle, whereby to change from the towing position to the stabilizing position, a direction of

the tow bar is reversed such that in the towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing position the second end portion extends substantially horizontally along a portion of the frame for two point connection therewith.

The present invention further provides a trailer, comprising: a frame mounted on a pair of primary wheels, and a multi-purpose tow bar, comprising an intermediate portion, a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle, whereby to change from the towing position to the stabilizing position, a direction of the tow bar is reversed such that in the towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing position the second end portion extends substantially horizontally along a portion of the frame for two point connection therewith.

The present invention further provides a kit of parts for a trailer having a frame mounted on a pair of primary wheels, comprising: a multi-purpose tow bar comprising an intermediate portion, a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle, and a stabilizing wheel, whereby to change from the towing position to the stabilizing position, a direction of the tow bar is reversed such that in a towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing

position the second end portion extends substantially horizontally along a portion of the frame for two point connection therewith.

In a further aspect of the invention the first end portion angles away from a plane containing the intermediate portion and the second end portion, such that in the stabilizing position the first end portion extends upwardly for suspension by the stabilizing wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate a preferred embodiment of the invention by way of example only,

Figure 1A is a perspective view of a tow bar according to the invention.

Figure 1B is an end elevation of a tow bar according to the invention.

Figure 2A is a perspective view of a trailer embodying the tow bar of Figure 1, with the tow bar in a towing mode.

Figure 2B is a perspective view of a trailer embodying the tow bar of Figure 1, with the tow bar in a stabilizing mode.

Figure 3A is a side elevation of the trailer of Figure 2A.

Figure 3B is a side elevation of the trailer of Figure 2B.

Figure 4A is a perspective view of the frame in the trailer of Figure 2A.

Figure 4B is a perspective view of the frame in the trailer of Figure 2B.

Figure 5A is a perspective view of the frame in the trailer of Figure 2A from the side opposite Figure 4A.

Figure 5B is a perspective view of the frame of Figure 5A with the main wheels removed for illustrative purposes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figures 1A and 1B illustrate a tow bar 30 according to a preferred embodiment of the invention. The tow bar 30 comprises an intermediate portion 32, a first end portion 34 for coupling to the frame of the trailer 10 in a towing position, and a second end portion 36 for coupling to a moving vehicle (for example a bicycle, not shown) in a towing position. The second end portion 34 extends from the intermediate portion 32 at a first angle, approximately 45 degrees in the embodiment shown, although this angle will vary depending upon the configuration of the trailer frame and the desired elevation of the second end 36 in the towing position.

In the preferred embodiment shown, the first end portion 36 extends from the intermediate portion 32 at a second angle, also approximately 45 degrees in the embodiment shown, although this angle will also vary depending upon the lateral width of the trailer. The second angle is circumferentially offset from the first angle by approximately 90 degrees, as best seen in Figure 1B, for reasons which will be described below. Thus, in the preferred embodiment the second end portion 36 is angled away from a plane containing the intermediate portion 32 and the first end portion 34.

Figures 2 to 4 illustrate a trailer in association with which the tow bar of Figure 1 may be used. The trailer illustrated is that shown and described in United States Patent No. 5,421,571 issued July 13, 1999 to Bell, which is incorporated herein by reference. It will be appreciated that the tow bar of the invention can be used with other types of trailers, collapsible or otherwise, and the invention is not intended to be restricted to the particular embodiment shown.

The trailer 10 comprises three basic frame members: a rear frame 18, a medial frame 20 and a chassis 22. The chassis 22 supports an axle 50 on each side of the trailer 10, via plastic axle mounts 50a, on which are respectively mounted wheels 12 providing primary support for the trailer 10. The a rear frame 18 and medial frame 20, as well as a boot bar 23, all provide support for a fabric covering which assists in maintaining the frame in the erected condition and provides a seat 27 for the occupant of the vehicle, as described in detail in United States Patent No. 5,421,571. In the embodiment shown the a rear frame 18 and medial frame 20 are hinged to the chassis 22 at the rear of the trailer 10, and the boot bar 23 is affixed to the chassis 22 by plastic axle mounts 50a.

The improvement herein comprises a multi-purpose tow-bar 30. In the towing position, shown in Figures 2A, 3A and 4A, the first end portion 34 is coupled to the frame of the trailer 10 adjacent to and forwardly one of the primary wheels 12, as best seen in Figure 4A. The first end portion 34 may be coupled by any suitable means, preferably via a plastic socket 40 with a receptacle for receiving the end of the tow bar 30, with a removable pin to releasably secure the end of the tow bar 30 to the socket 40. The first end portion is further coupled to the chassis 22 forwardly of the wheels 12, via plastic retaining bracket 42 and releasable pin, to rigidly couple the tow bar 30 to the frame of the trailer 10. In this fashion, the second end portion 36 of the tow bar 30 extends forwardly of the trailer 10 at a height which allows the trailer 10 to assume the desired attitude when the tow coupling 50 at the end of the second end portion 36 is coupled to a towing vehicle (for example a bicycle, not shown); and toward the lateral centre of the trailer 10, so that the towing force is applied generally along an axis extending through the lateral centre of the trailer 10.

Because of the configuration of the frame as illustrated, the angle of the first end portion 34 relative to the intermediate portion 32 allows the first end portion 34 to be coupled to the trailer 10 at two points of connection along the frame, while

maintaining the intermediate portion 32 generally level when the trailer 10 is coupled to a towing vehicle. At the same time, the angle of the second end portion 36 relative to the intermediate portion 32 allows the intermediate portion 32 to extend forwardly along the side of the trailer 10 but allows the towing force to be applied along the lateral centre of the trailer 10. It will be appreciated, however, the frame may itself be configured to permit two points of connection between the first end portion 34 and the frame, in which case the first end portion 34 may not need to extend from the intermediate portion 32 at an angle.

In the stabilizing position, shown in Figures 2B, 3B, 4B, 5A and 5B, the second end portion 36 is coupled to the frame of the trailer 10. The end of the tow bar 30 (supporting the tow coupling 50) is coupled to the trailer 10 adjacent to and rearwardly of one of the primary wheels 12, for example via plastic socket 44 with a receptacle for receiving the end of the tow bar 30, with a removable pin to releasably secure the end of the tow bar 30 to the socket 44, as best seen in Figures 4B and 5B. The second end portion 36 thus extends parallel to the side of the trailer, with the intermediate portion 32 angled toward the lateral centre of the trailer 10. Preferably a retaining bracket 46 is provided near the front of the boot bar 23, for supporting the front of the frame, optionally with a retaining pin.

In the embodiment illustrated, with the tow bar 30 so secured to the trailer 10 in the stabilizing position the first end portion 34 is directed upwardly, because of the offset between the angles at which the first and second end portions 34, 36 respectively extend from the intermediate portion 32. A large stabilizing wheel 48 can then be coupled to the first end portion 34, via a releasable pin 48a or other axle-like element, to render the trailer 10 self-supporting. As noted above, if frame is suitably configured it will permit two points of connection between the first end portion 34 and the frame and still allow a clearance for a large stabilizing wheel 48, even if the first end portion 34 does not extend from the intermediate portion 32 at an angle. In

either case the second end portion 36 is preferably secured to the chassis 22 at a second connection point forwardly of the wheel 12, to resists shifting due to torsional forces on the tow bar 30 during use.

In use in the towing position, the tow bar 30 is affixed to the trailer by inserting the end of the first end portion 34 into the socket 40 and inserting removable pin 40a to releasably secure the tow bar 30 to the frame. The first end portion 34 is also inserted into retaining bracket 42 and retained therein by removable pin. The tow coupling 50 can then be secured to the towing vehicle in conventional fashion, and the towing vehicle suspends the front of the trailer 10 during use.

In use in the stabilizing position, for a self-supporting stroller or jogger-type vehicle, the tow bar 30 is affixed to the trailer by inserting the end of the second end portion 36 into the socket 44 and inserting removable pin to releasably secure the tow bar 30 to the frame. The second end portion 36 is also inserted into retaining bracket 44 and retained therein by removable pin. The stabilizing wheel 48 can then be mounted to the first end portion 34, and the stabilizing wheel 48 suspends the front of the trailer 10 during use as a stroller or jogger. An optional handle 52 may be affixed to the trailer 10 in any suitable fashion in order to facilitate pushing the trailer 10 in the stroller/jogger mode.

A preferred embodiment of the present invention having been thus described herein by way of example, it will be appreciated by those skilled in the art that variations may be made thereto without departing from the spirit of the invention as set out in the appended claims.

I CLAIM:

1. A multi-purpose tow bar for a trailer having a frame mounted on a pair of primary wheels, the tow bar comprising:

an intermediate portion,

a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and

a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle, whereby to change from the towing position to the stabilizing position, a direction of the tow bar is reversed such that in the towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing position the second end portion extends substantially along a portion of the frame for two point connection therewith.

2. The frame according to claim 1 in which the first end portion angles away from a plane containing the intermediate portion and the second end portion, such that in the stabilizing position the first end portion extends upwardly for suspension by the stabilizing wheel.

3. A trailer, comprising:

a frame mounted on a pair of primary wheels, and

a multi-purpose tow bar, comprising

an intermediate portion,

a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and

a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle,

whereby to change from the towing position to the stabilizing position, a direction of the tow bar is reversed such that in the towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing position the second end portion extends substantially along a portion of the frame for two point connection therewith.

4. The trailer according to claim 3 in which the first end portion angles away from a plane containing the intermediate portion and the second end portion, such that in the stabilizing position the first end portion extends upwardly for suspension by the stabilizing wheel.

5. A kit of parts for a trailer having a frame mounted on a pair of primary wheels, comprising:

a multi-purpose tow bar comprising an intermediate portion, a first end portion for coupling to the frame in a towing position and for supporting a stabilizing wheel in a stabilizing position, and a second end portion for coupling to a moving vehicle in a towing position and for coupling to the frame in a towing position, extending from the intermediate portion at an angle, and

a stabilizing wheel,

whereby to change from the towing position to the stabilizing position, a direction of the tow bar is reversed such that in a towing position the second end portion extends forwardly of the frame for coupling to a towing vehicle at a level which suspends a front end of the frame, and in a stabilizing position the second end portion extends substantially along a portion of the frame for two point connection therewith.

6. The kit of parts according to claim 5 in which in which the first end portion angles away from a plane containing the intermediate portion and the second end portion, such that in the stabilizing position the first end portion extends upwardly for suspension by the stabilizing wheel.

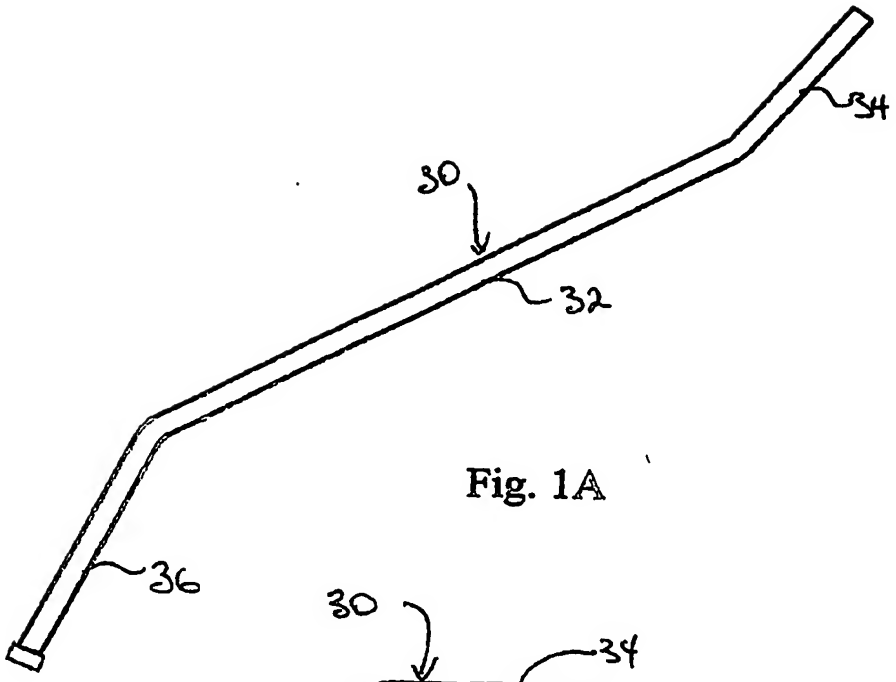

Fig. 1A

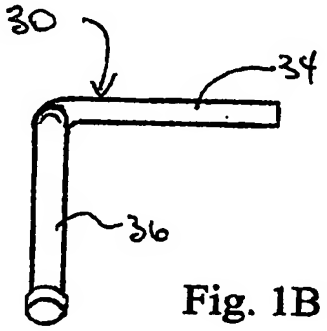

Fig. 1B

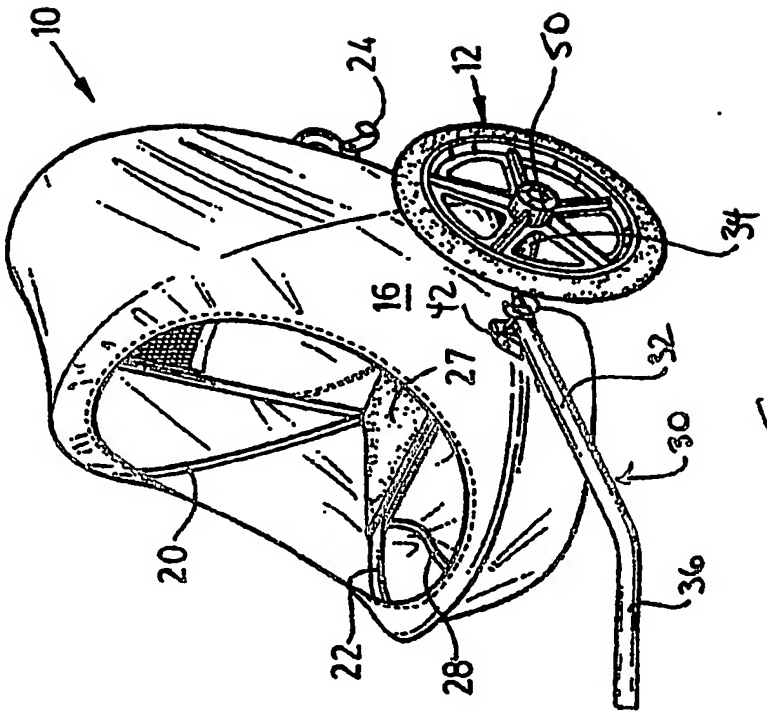

Fig. 2A

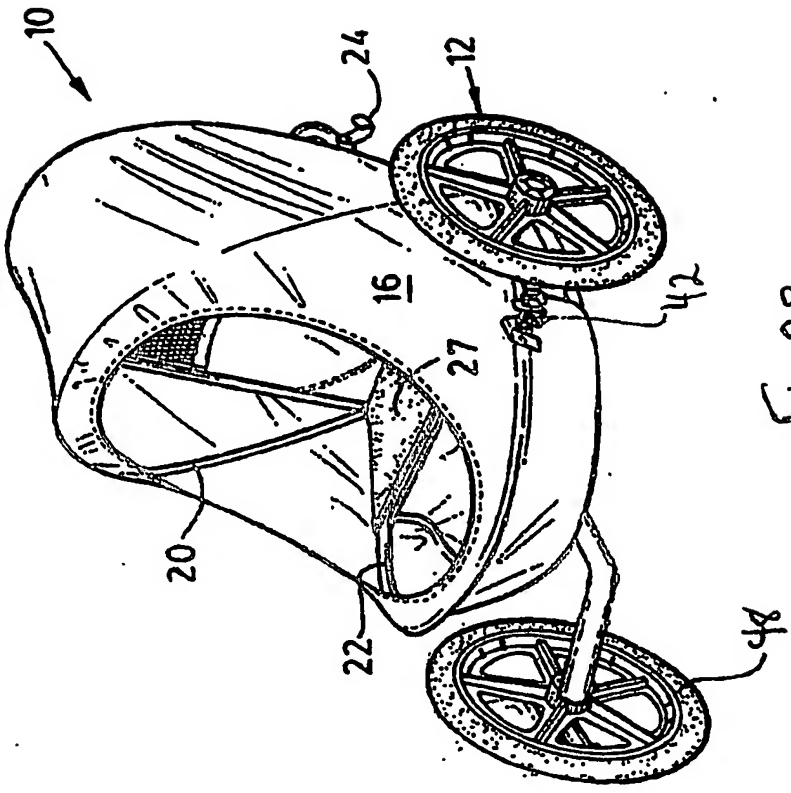

Fig. 2B

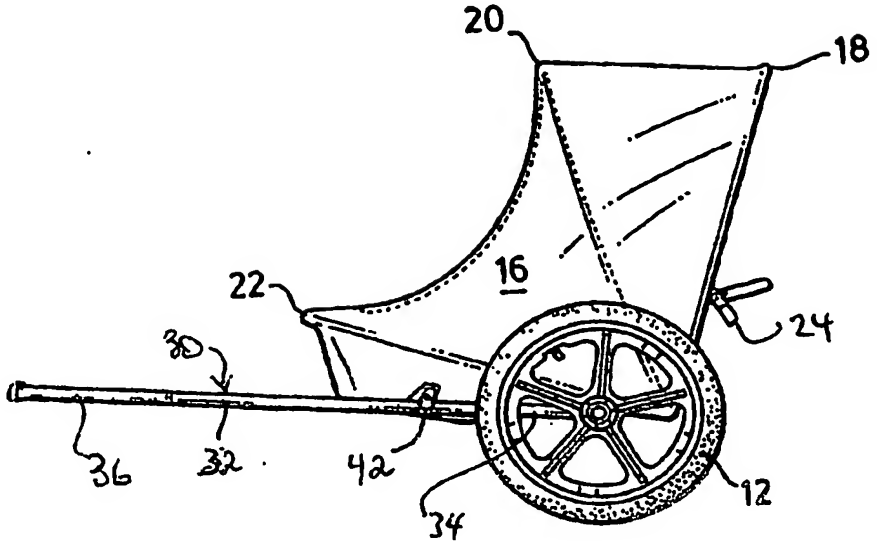

FIG 3A

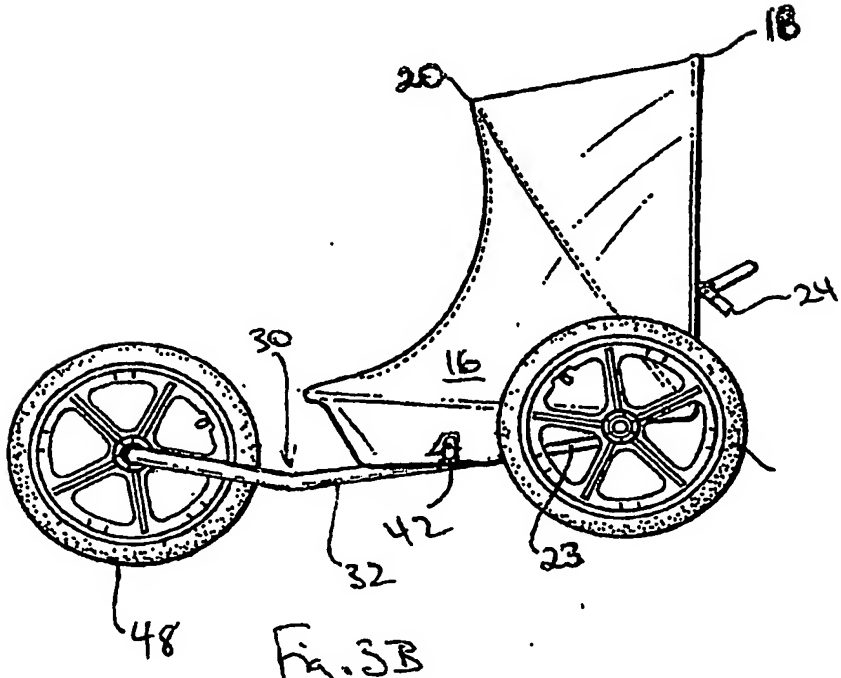

Fig. 3B

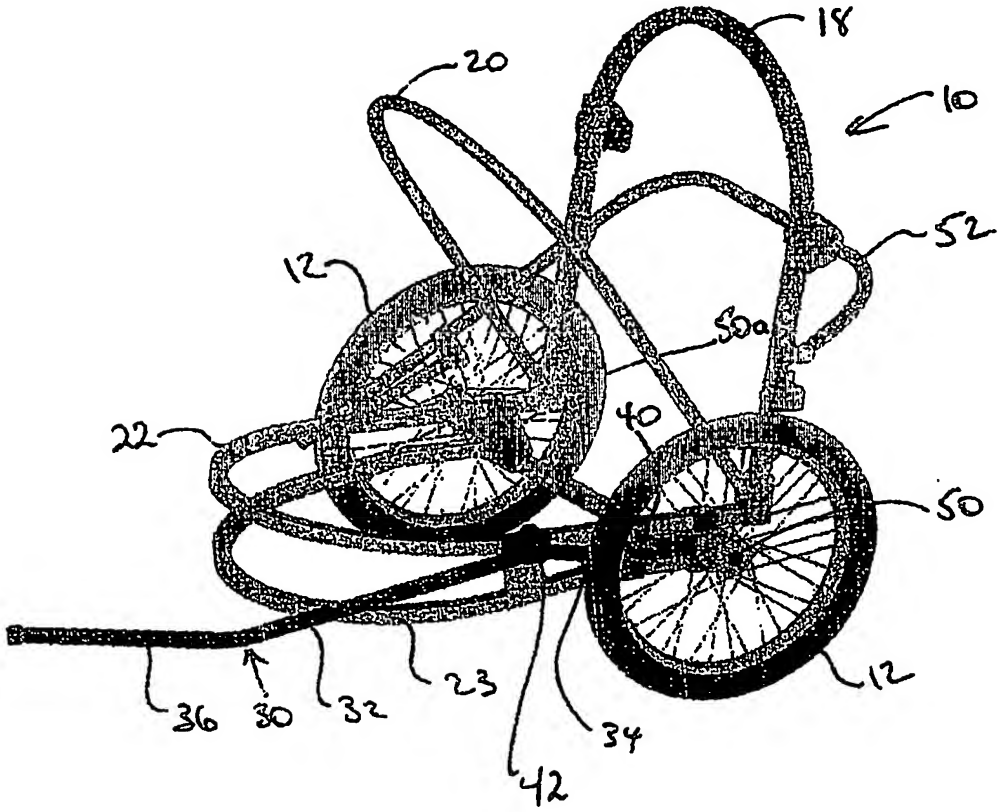

Fig. 4A

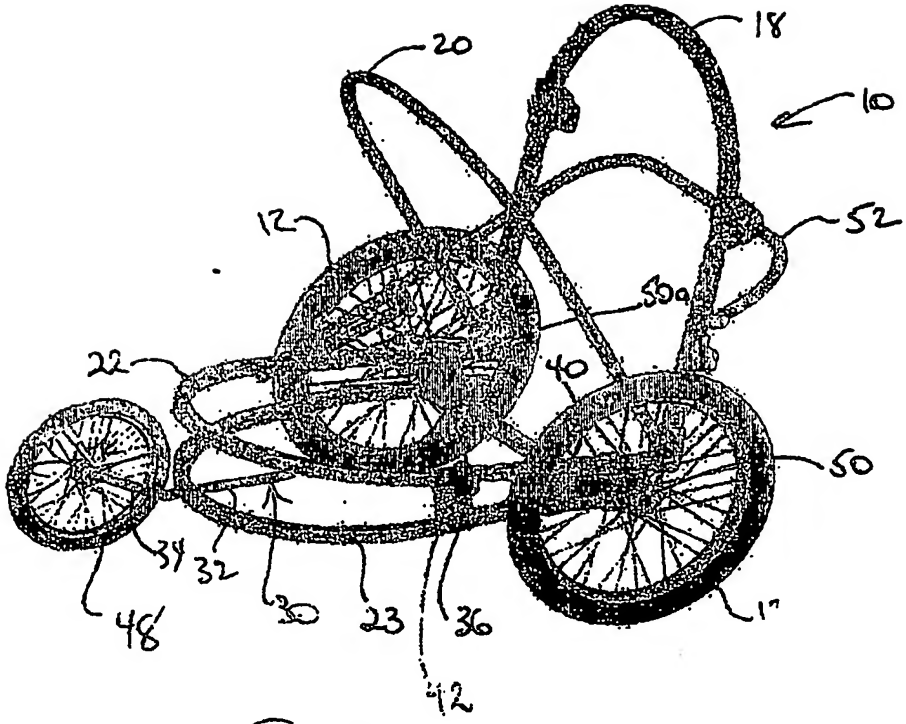

Fig. 4B

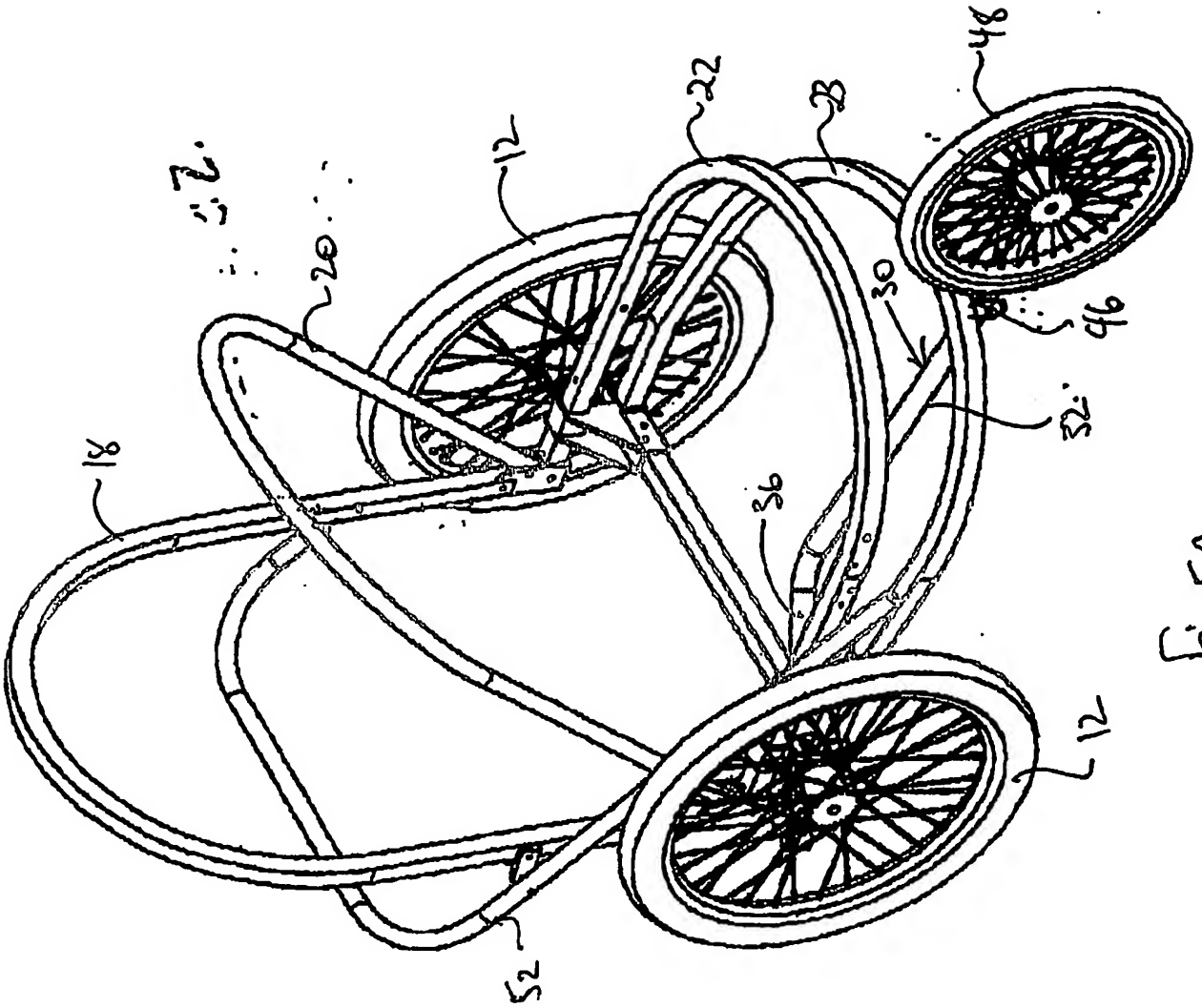

Fig. 5A

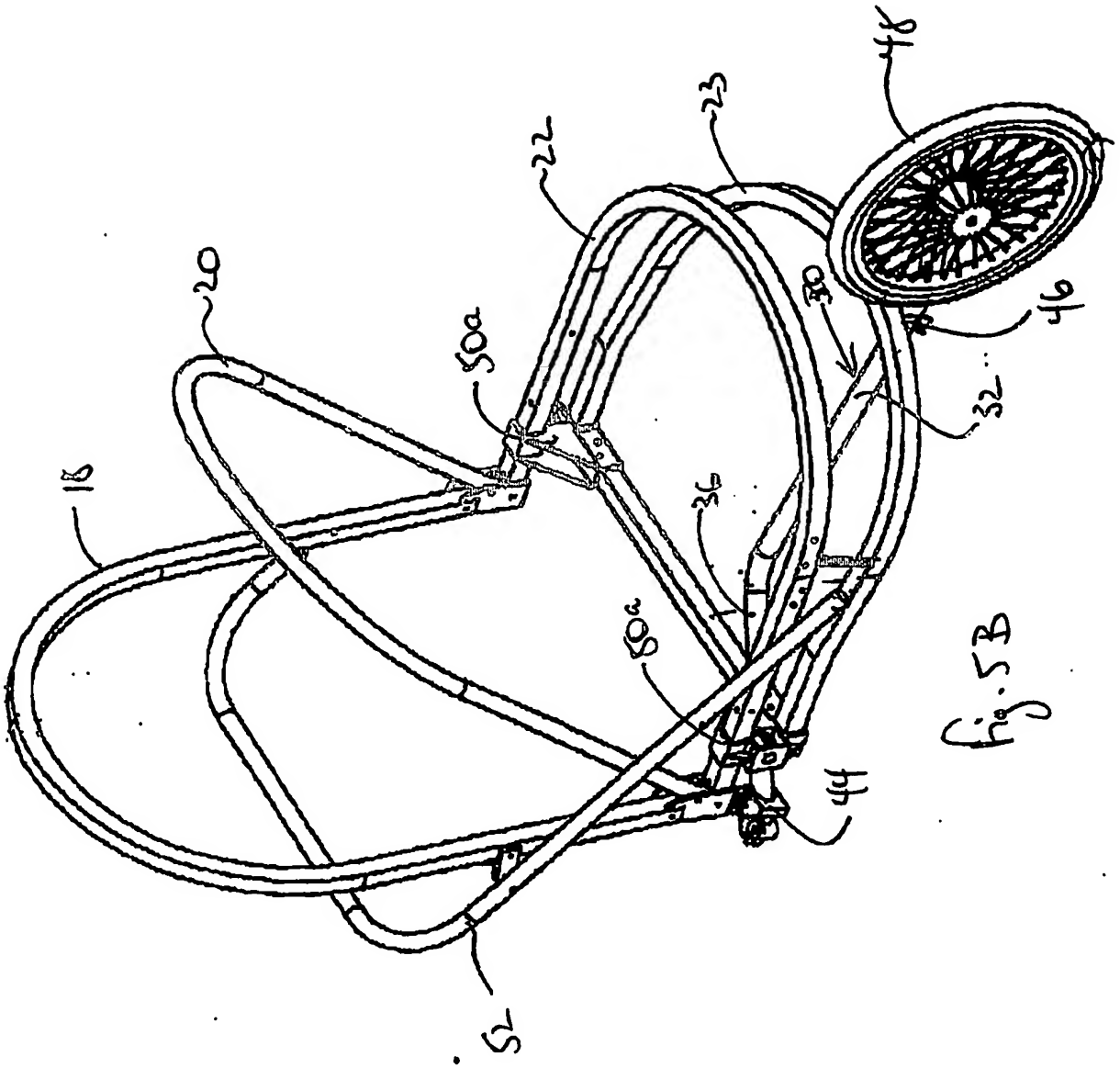

Fig. 5B

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